CHRONIC RUMINATORS REMEMBER MORE EPISODIC DETAILS OF A RECENT UPSETTING EVENT

by

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Abstract

Previous research by Kathryn Hardin (2017) suggests that chronic rumination of a recent, sad event by college students is associated with better performance on memory tests. Extending this research, the present study uses data collected from a previous study where participants told a recent, sad event in their lives, and were then randomly assigned to either ruminate on the story or not while they performed other memory tests. Participants were asked to retell the stories after performing the memory tests. The present study analyzes the changes between the first tellings of the stories to the second, and the difference in an individual's recall of semantic and episodic information after rumination. Understanding how the stories change before versus after rumination, and how consistent individuals were with details in their recollection is an important psychological question, as episodic and semantic recall have been shown to differently influence affect . We hypothesize that those with experimentally-induced rumination will provide more consistent recollections of stories and will be less likely to leave out episodic or semantic information from the first to the second telling. Questionnaire data on chronic rumination tendencies and depression symptoms provides further insight into the behaviors already exhibited by the participants.

Chronic Ruminators Remember More Episodic Details Of A Recent Upsetting Event

Marcel Proust wrote "Remembrance of things past is not necessarily the remembrance of things as they were." In the past several decades, research in psychology has found this to be true. Unlike a book on a shelf, memories are shaped and reshaped each time they are recalled. People may enhance or inhibit memories in a way that is personally relevant. This thesis examines memory from the combined perspective of clinical and cognitive psychology, in an attempt to enhance understanding of what our mind chooses to remember. In particular, I examine how the emotion regulation strategy of *rumination* impacts what is recalled when people remember an upsetting event.

Rumination

Nolen-Hoeksema and colleagues (e.g., Nolen-Hoeksema, 1991), who have done extensive research on the topic, define rumination as a passive emotion regulation strategy. Ruminators focus on negative thoughts, feelings, or events in an unproductive manner, even after stimuli have ended (Martin & Tesser, 1996). Chronic ruminators tend to not actively problem solve (Carver, Scheier, & Weintraub, 1989), and in turn fixate on the details and feelings about the problems. Examples of ruminative behaviors or thoughts include isolation to ponder one's emotions (e.g. thinking about how tired one is), potential reasons for depression (e.g. thinking to oneself "Why does no one else get depressed when I do?"), as well as potential negative outcomes of negative emotions (e.g. "I can't get work done when I feel like this"; Nolen-Hoeksema, 1987). Rumination tends to prolong distressing emotions and depressed mood (Nolen-Hoeksema, 1991).

While rumination is connected to maladaptive traits and coping strategies (Aldao et al., 2010; Nolen-Hoeksema, et al., 2008), rumination has a unique relationship with clinical depression, even when controlling for other psychopathologies. The focus on emotions is important to the relationship between rumination and depression for two reasons. First, in most cases, depression isn't tied to a single life event (Lloyd, 1980) but there are still debilitating symptoms involved with/leading to rumination. Second, when people are focused on their depression, they are focusing on negative content, making it more likely that they will start thinking negatively due to their mood (Teasdale, 1983).

According to response styles theory, one danger of rumination is that it inhibits active problem solving, which prevents individuals from making changes that could reduce their negative emotions; rather, ruminating people will fixate on their problems and emotions without finding anything to distract themselves from their situation (Nolen-Hoeksema, 1991). People who ruminate tend to show longer periods of depression when compared with people who distract themselves by using pleasant activities to lift their mood before focusing on solving their problems (Nolen-Hoeksema, 1991).

While some might believe that passive focus will help individuals reach an understanding about their problems as well as themselves, rumination is not a stand in for problem solving and could possibly act as an interference for effectively solving problems (Nolen-Hoeksema, 1991). A study by Morrow (1990) discovered that participants who were instructed to partake in a rumination task while experiencing depression were not able to problem solve for life events as well when compared to depressed participants while partaking in the distracting task. Rumination is also associated with several maladaptive traits including "negative inferential or

attributional styles, dysfunctional attitudes, hopelessness, pessimism, self-criticism, low mastery, dependency, sociotropy, neediness, and neuroticism" (Nolen-Hoeksema et al., 2008, p. 400) even after controlling for depression. The relationship between rumination and depression appears greater, however, than can be accounted for merely by these traits (Flett et al., 2002; Nolen-Hoeksema et al., 1994; Spasojevic & Alloy, 2001).

Nolen-Hoeksema (1991) found that rumination will heighten and lengthen negative emotional states, specifically depression, through three mechanisms. First, rumination augments depressed mood, increasing the likelihood that a negative mood will trigger depressive thoughts when contemplating their situation. Second, rumination does not facilitate problem solving, specifically making thoughts more negative and discouraging. Lastly, rumination inhibits instrumental behavior, a person's drive and energy, allowing for a greater chance of disturbing and stress inducing situations (Nolen-Hoeksema, 1991). Further, Nolen-Hoeksema and Davis (1999) found that individuals who continually ruminate will eventually lose their social support systems which will then worsen depression. The effects of rumination can enhance first symptoms of depression and worsen it overall, leading to more severe depression and lengthening current episodes (Nolen-Hoeksema & Davis, 1999; Nolen-Hoeksema, et al., 1999; Nolen-Hoeksema, Parker, & Larson, 1994).

Research also suggests that some aspects of rumination may be worse than others. Treynor and colleagues (2003) found evidence for a two factor model of rumination, when analyzing rumination unconfounded with depression. The components of rumination are reflective pondering and brooding. Webster's Dictionary defines reflection as "...to engage in contemplation," and defines brooding as "...to think anxiously or gloomily about." The two

components were found to relate differently to depression, with brooding being more strongly associated with depression than reflection. The findings support Nolen-Hoeksema's Response Styles Theory (1987), which says that rumination can advance symptoms of depression. Other researchers have found factors related to reflection and brooding. Cox et al. (2001) found reflection related to self-focus, Roberts et al., (1998) found reflection related to introspection/self-isolation, and Bagby and Parker (2001) found reflection related to self-focused rumination. As far as brooding, Roberts et al. (1998), found it related to self-blame. In summary, reflection suggests "a purposeful turning inward to engage in cognitive problem solving to alleviate one's depressive symptoms" and in turn, brooding suggests "a passive comparison of one's current situation with some unachieved standard" (Treynor et al., 2003).

Rumination and Memory

Rumination is also thought to play a role in a phenomenon known as "Overgeneral Memory" found in people with depression (Williams et al., 2007). Overgeneral memory can be defined as a person's tendency to not recall a specific autobiographical event ("I ate dinner last night at home), and instead recalling a more general category of events ("I eat dinner every night") . To test for overgeneral memory, Williams and Broadbent (1986) developed a method, the autobiographical memory test (AMT), to record responses to emotion-eliciting cue words. In the AMT, participants recall a specific event in response to a given word. Narratives were instructed to have occurred at a certain place and last a day or less. When responding to prompts on the AMT, participants give two types of details: episodic and semantic. Episodic details are specific to the event and semantic details are external to the event. Individuals who engage in overgeneral memory are more likely to produce more semantic details on this task, whereas

those who do not engage in overgeneral memory are more likely to produce more episodic details on this task. Williams et al. (2007) reviewed research on the AMT in people with and without major depressive disorder (MDD), and found that those with MDD are more likely to share the phenomenon of overgeneral memory.

To explain this finding of the relationship between MDD and overgeneral memory, Williams et al. (2007) developed the CaR-FA-X model, which proposes three mechanisms for the effect: capture and rumination (CaR), functional avoidance (FA), as well as impaired executive control (X). The CaR-FA-X model predicts that a reduction in specific autobiographical memory, which is related to the development and continuation of emotional disorders, could be the outcome of greater rumination. The first aspect of the model, featuring capture and rumination, is believed to take place when self-relevant ideas activate rumination during memory retrieval, thereby 'capturing' cognitive resources and disrupting the retrieval search (Williams et al., 2007). In functional avoidance, specific memories passively avoided in order to regulate affect; this behavior is believed to initially activate when responding to early signs of trauma. The last mechanism of the model, impaired executive control, suggests that a shortage of executive resources impairs the capability to activate a strong retrieval search, which results in overgeneral memory. The authors postulate that all three components reinforce the overgenerality in autobiographical memory, as well as issues related to the overgeneralization including future imagination, continued emotional disturbance, and problem solving (Williams et al., 2007).

Sumner (2012) elaborates on the idea of overgeneral autobiographical memory in emotionally disturbed individuals. In particular, she suggests that maladaptive aspects of

rumination, including abstract processing styles and focus on negative content related to self, contribute to reduced memory specificity. She also theorizes that overgeneral memory is a cognitive avoidance strategy and non-specific styles of retrieval are associated with little distress after an alarming experience - at a minimum, in the short term.

In more recent research, however, Chiu and colleagues (2018) found little evidence to support the CaR-FA-X model relating memory specificity to increased rumination. Chiu et al. (2018) conducted a meta-analysis on the relationship between memory specificity and rumination, the first regarding this area of research. In the meta-analysis, rumination and memory specificity were not found to have a significant relationship, even when rumination was examined as the separate components of reflection and brooding. Other research suggests that factors other than rumination, such as trauma, may be responsible for the relationship between memory specificity and depression (Chiu et al., 2018). Chiu et al. (2018) suggest that when cued with self-relevant words, rather than the general words used in the AMT, there might be a more significant relationship between rumination and memory specificity.

A recent study in our lab (Hardin, 2017), similarly found that rumination did not impair memory. In the study, college students were asked to tell a story about a recent and sad event in their lives and then were randomly assigned to either ruminate or not ruminate on the story they told. They were simultaneously given a memory test to perform. After completing the memory test, the participants were asked to tell their story again. Questionnaire data was collected on chronic ruminative tendencies and on depressive symptoms. While Hardin (2017) expected that the experimentally-induced rumination would impair participants' performance on the memory tests, evidence did not support this hypothesis. Surprisingly, higher levels of chronic rumination

were actually correlated with better memory. In the study, participants' stories were collected and transcribed, but the study did not specifically investigate whether people who report high levels of chronic rumination recounted more overgeneral memories. This was the goal of the current study.

The Current Study

In the current study, I investigated whether there were both correlational and experimental relationships between rumination and retrieval of specific memory details of a recent upsetting event. Using the previously collected data (Hardin, 2017), I first examined whether chronic rumination was correlated with episodic specificity in the initial narrative participants provided. Operating on the assumption that CaR-FA-X is correct, participants with higher rumination scores should produce less episodic information and greater semantic information in their stories. I then examined whether the experimentally induced rumination impacted the change in memory specificity from the first to second story telling. Again operating on the assumption that CaR-FA-X is correct, participants should display less episodic details and more semantic details in the rumination condition than the control condition at the second story telling.

Method

The procedures used in this study were approved by the Appalachian State University IRB on 10/27/16 (IRB # 17-0009). See the Appendix for IRB approval page and consent form.

Participants

Participants were 100 students from Appalachian State University who received partial course credit for completing the study. Before data collection for the study, it was decided that

the participant age range would be from 18-23 years. Four participants had their data omitted from analyses due to exceeding this age range (26, 27, 36, and 54 years of age), decreasing the sample size to 96 participants. The final sample ranged from 18-22 (M = 19.20, SD = 1.14). Of the 96 participants, 25 were male.

Every participant was requested to fill out the Beck Depression Inventory-II (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) to determine depressive symptoms, however, two of the participants did not fully finish the inventory and one participant decided to opt out of the questionnaire. Of the participants who filled out the inventory, 84.9% did not meet the cutoff for any level of depression (n=79), 8.6% exceeded the threshold for mild depression (n=8), 5.4% exceeded the threshold for moderate depression (n=5), and 1.1% met the criteria for severe depression (n=1).

Along with finishing the BDI-II, participants were requested to self-report if they had a prior or current diagnosis of depression and if they were currently medicated with antidepressants. Most of the participants (n=76) indicated no diagnosis of depression, although of those participants, one indicated using antidepressant medication. Seven participants reported a current diagnosis of depression and symptoms, six of whom indicated using antidepressant medication. Another 12 participants reported a previous diagnosis of depression but reported no current symptoms, and three of those twelve were still using antidepressants. In addition, one participant declined sharing mental health information..

Materials

Beck Depression Inventory-II. The Beck Depression Inventory-II (BDI-II; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) measures the presence and intensity of depressive

symptoms. The inventory consists of 21 self-report statements. The participants answer on a 0-3 scale, with lower scores indicating lower intensity of depressive symptoms. Overall scores range from 0-63, with low amounts of depression falling under the 0-13 range, mild amounts of depression falling in the 14-19 range, moderate amounts of depression falling in the 20-28 range, and scores of 29 and above indicating severe depression.

Rumination Response Scale. The Rumination Response Scale (RRS; Treynor, Gonzalez, & Nolen-Hoeksema, 2003) consists of 22 items to determine the frequency of ruminative behaviors. With each statement, participants respond on a 1-4 Likert scale with lower answers representing less frequent behavior. Ruminative behaviors on the RRS include: "think about a recent situation, wishing it had gone better", "think about how sad you feel", and "think about all your shortcomings, failings, faults, and mistakes". Overall scores range from 22-88, with high scores representing high frequency of rumination. There are three subcomponents of the RRS: Depression, Brooding, and Reflection. Symptoms of depression are more actively related to Brooding than to Reflection (Sumner, 2012).

Beck Anxiety Inventory. The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1998) asks participants to report how much a list of 21 anxiety symptoms distress them. The scale ranges from 0 = "Not at all" to 3 = "A lot". Included on the scale are mental items such as "fear of losing control" and physical items such as "heart racing". Overall scores range from 0-63, with high scores representing high levels of anxiety.

Procedure

Participants provided informed consent before being individually tested in a low noise volume room by one experimenter. Questionnaires were completed before the participant

completed the experimental part of the study; this was to make sure that the experimental rumination induction did not interfere with participants responses, as well as to fulfill the IRB requirement of checking participants' responses to the BDI's question pertaining to suicide.

Following questionnaire completion, participants were asked to narrate a recent and specific upsetting event for a minimum of three minutes but no more than five minutes. The experimenter was ready with prompting questions to ask for more information if the participant could not talk for the required time. Sessions were voice recorded. Participants were told to follow the listed instructions:

> I would like you to describe a recent emotionally upsetting negative event. This event must be something that occurred to you and should have lasted at least a few minutes but less than one day. For example, an ongoing fight with a friend would not be sufficient, but a specific confrontation would work well. As you describe the event, I would like you to concentrate on what things happened during the event, including what people might have said or did. I would like you to talk about how this made you feel and what the consequences of the event may be.

After narrating the event, control condition participants were not given further instructions. Rumination condition participants were then told the following instructions:

> While we complete the rest of the study, I would like you to think about your feelings about this event, what they might mean, and what might have caused them. After the study is over, I will ask you to retell the event. When you are retelling the story, I would

like you to include the same details as you did now and also include any new emotions that may arise while you are thinking about the event.

Participants were then asked to perform the Wechsler Memory Scale - Fourth Edition (WMS-IV) and a manipulation check, which instructed the participants to describe "how much they had been thinking about their story" on a 1-6 scale with low scores representing the least amount of thought and the high scores representing the most amount of thought.

After the cognitive battery, participants were asked to repeat their original memory using the following instructions: "I would like you to retell the story you told me at the beginning of the study. As you repeat your story, please try your best to include the same details as you did before."

Lastly, the participants filled out the RRS. This questionnaire was given to the participants after the completion of the study so that emotion regulation strategies were not influenced during the study.

Memory Coding and Interrater Reliability

There are two main areas of research that involve coding memory specificity: clinical and cognitive. Clinical research, typified by the use of the AMT, involves coding memory specificity of multiple short memory descriptions. Cognitive research, in contrast, involves coding much longer single memories for the number of episodic and semantic details a participant produces. Because participants in the current study told a single, extended story (rather than multiple short descriptions), cognitive research coding was used in this study. The coding system used was based on the one developed by Levine, Svoboda, Hay, Winocur, and Moscovitch (2002).

First, both the first and second stories were recorded and transcribed, with questions and clarifications by the interviewer omitted from the narratives. Next, each set of narratives from the participants were coded by two coders (the study author and one additional student), who were blind to the conditions of the participant. A main event was determined and each memory was coded into segments of information, or details. A detail is defined as a specific thought, occurrence, or observation. Two types of details were coded. Episodic details are defined as any sensory, perceptual, emotion, and time-related details about the event being described. They are only coded when the participant has retrieved a specific event, and so reflect specific retrieval. Semantic details are defined as memory for facts and information that are external to the event being described. The interrater reliability was 0.82 for episodic details and 0.88 for semantic details. The number of episodic and semantic details for each narrative were averaged across coders for analysis.

Predictions

If the CaR-FA-X model is correct, people with high rumination scores on the RRS should share less episodic information and more semantic information in the immediate recall of their story. In the second recall of the story, if theCaR-FA-X model is correct, participants in the rumination condition, but not the control condition, should reduce their number of episodic details and increase their number of semantic details across time.

Results

Correlational Findings

Scatterplots of the correlational relationships between rumination scores on the RRS and details provided in immediate recall may be seen in Figure 1. Our correlational findings did not

support the hypotheses, with chronic ruminators producing both more episodic details in their narratives, $r(82) = 0.41$, $p < .001$, and more semantic details, $r(82) = 0.24$, $p = .027$. Inspecting the scatterplots indicated that one outlier appeared to be driving the correlation between rumination and semantic details. As may be seen in Figure 2, once the outlier was removed from the data, the relationship between RRS scores and semantic details was no longer significant, $r(81) = 0.38$, $p = .73$. After removing the outlier, there was still a correlation between episodic details and rumination scores, $r(81) = .35$, $p = .001$.

Experimental Findings

Scatterplots of the experimental findings may be seen in Figure 3. To analyze the experimental data, we conducted a 2 (Condition: Rumination vs. Control) x 2 (Time Point: First vs. Second story) x 2 (Detail Type: Episodic vs. Semantic) Analysis of Variance (ANOVA), with condition as a between-subjects variable, and time point and detail type as within subjects variables. The ANOVA indicated a main effect of detail type, $F(1,86) = 12.99$, $p = .001$, $\eta_p^2 = .13$, with participants reporting more episodic details ($M = 18.19$, 95% CI = 15.98-20.41) than semantic details, ($M = 13.01$, 95% CI = 11.05-14.97). The ANOVA indicated a main effect of time point, $F(1,86) = 366.97$, $p = .000$, $\eta_p^2 = .81$, with participants reporting more details in the first story ($M = 20.49$, 95% CI = 18.65-22.33) than the second story, ($M = 10.71$, 95% CI = 9.37-12.05). The ANOVA indicated a main effect of condition, $F(1,86) = .55$, $p = .458$, $\eta_p^2 = .006$, with people reporting fewer details in the control condition ($M = 16.17$, 95% CI = 13.92-18.43) than in the rumination condition ($M = 15.03$, 95% CI = 12.97-17.09). Finally, the ANOVA also indicated a Detail Type x Time Point x Condition interaction, $F(1,86) = 4.26$, $p = .042$, $\eta_p^2 = .05$. As may be seen in Figure 2, the interaction indicated that participants in the

control condition dropped more semantic than episodic details in between storytellings, $F(1,47) = 6.51$, $p = .014$, $n = 0.122$, whereas participants in the rumination condition dropped equal numbers of each type of detail, $F(1,47) = 0.16$, $p = .688$, $\eta_p^2 = 0.004$. This result is partially in line with predictions, as people in the rumination condition were less likely to drop semantic details than people in the control condition. Some caution is warranted in the interpretation of this finding, however, since the two conditions differed in detail production at baseline.

Exploratory Analyses

Due to the apparent disparity between the correlational and experimental findings, it is possible that the relationship between rumination and memory specificity might be the result of a third variable. To investigate this possibility, I also investigated whether episodic and semantic details in the first story were correlated with participants' anxiety and depression scores. As may be seen in Figure 4, Participants' Beck Anxiety Inventory scores were strongly associated with production of episodic details, $r(85) = .39$, $p \leq .001$. There was also a positive correlation between Beck Depression Inventory scores and episodic details, $r(85) = .20$, $p = .067$, but this relationship was not as strong.

Discussion

I hypothesized that if the CaR-FA-X model is correct, both people who are high in chronic rumination and people who are instructed to ruminate on an event should remember fewer episodic details of a recent upsetting event. With respect to chronic rumination, our results actually found evidence against CaR-FA-X. The correlational findings showed that the chronic ruminators from the study actually had better autobiographical memory, which means they included more specific details pertaining to the event. In regards to the experimental results from

the study, there was a slightly different outcome than the correlational findings. The results were taken from the difference between the first and second tellings of the narrative, and we looked at the difference between the control condition and the rumination condition. In general, most participants had less details in the second narrative, as they told a shorter version of the story. In the retelling of the story in the control condition, compared to the first telling of their narrative, participants dropped more semantic details compared to episodic details. In the rumination condition, participants dropped an equal number of semantic and episodic details. However, both conditions differed in number of episodic details at the start, so the interpretation should be taken with caution. If participants told more episodic details in the first narrative, they would have more allowance to drop their number of details in the second narrative if they were trying to summarize their first telling into a more concise story. The experimental findings partially support predictions from the CaR-FA-X model.

There are implications from this study, as well as from Chui et al. (2018) and Hardin (2017), that the CaR-FA-X model might need to be revisited. Research needs to be broadened to include testing methods beyond the autobiographical memory test (AMT), as it is currently the only test used in most of the extant CaR-FA-X research. The results of most of the research supporting the CaR-FA-X model could actually be a result of the type of cues that are being used from the AMT, and the overgeneralization of memory could be attributed to the method used in that type of test and not the actual theory. One strength of the current study was that it specifically examined participants' memories of an upsetting event, exactly the kind of event that should spark rumination in those with this tendency.

Future research should focus on how anxiety may influence the relationship between rumination and memory. In the process of analyzing the present study, it became apparent that there could be factors associated with memory other than just rumination. Anxiety had a strong relationship with rumination and depression did not have a strong relationship. It is possible that this trio (anxiety, depression, and rumination) each influences memory separately, and looking at their individual contributions could be beneficial. Considering that participants high in anxiety reported more episodic details, it would be interesting to research on memory and emotion to investigate whether fear can improve memory for details of events. In addition, future research needs to use methods beyond the AMT, and explore the theory that chronic ruminators might have better recall because of the introspective nature of remembering the events and constantly thinking about them.

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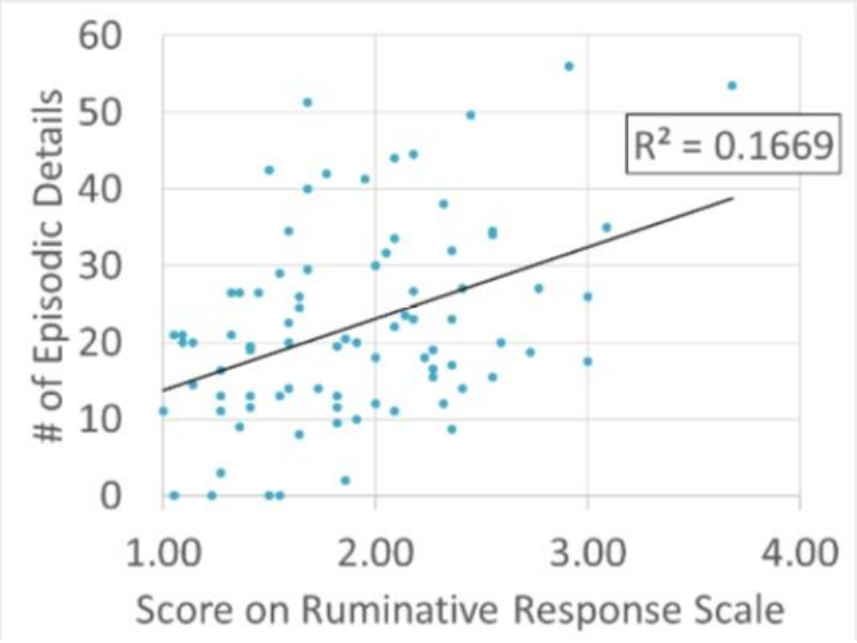


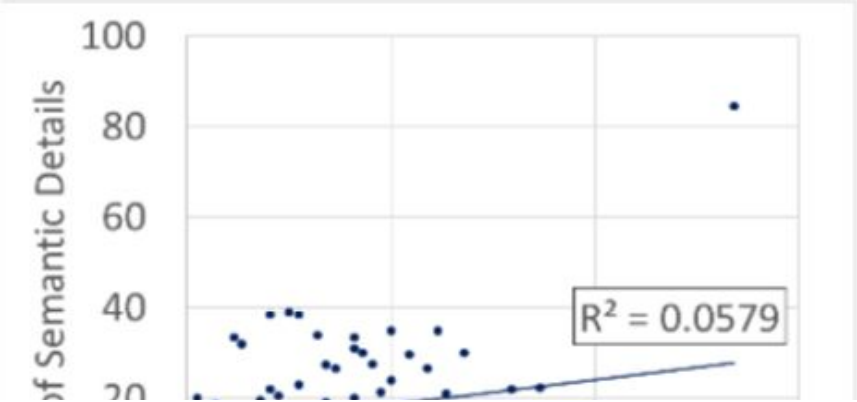


Figure 1. Scatterplots of correlational relationship between RRS scores and episodic details and semantic details, respectively.

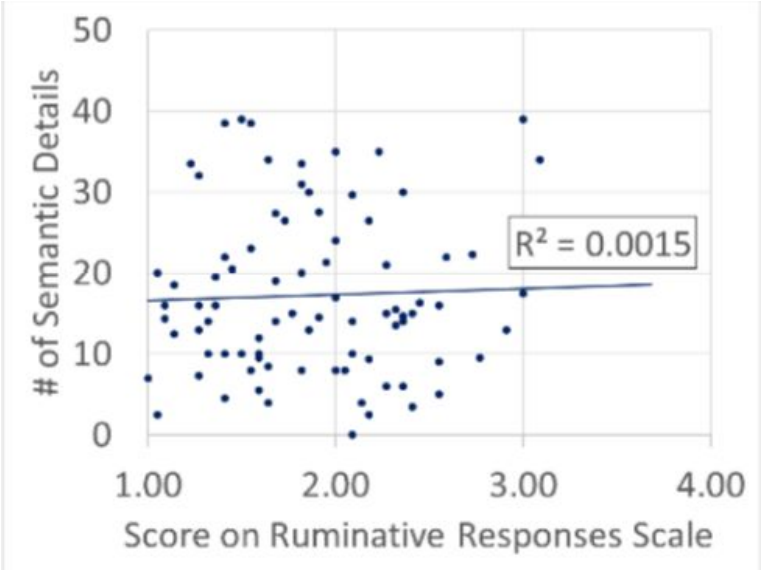


Figure 2: Scatterplot for the relationship between RRS scores and semantic details after the outlier was removed.

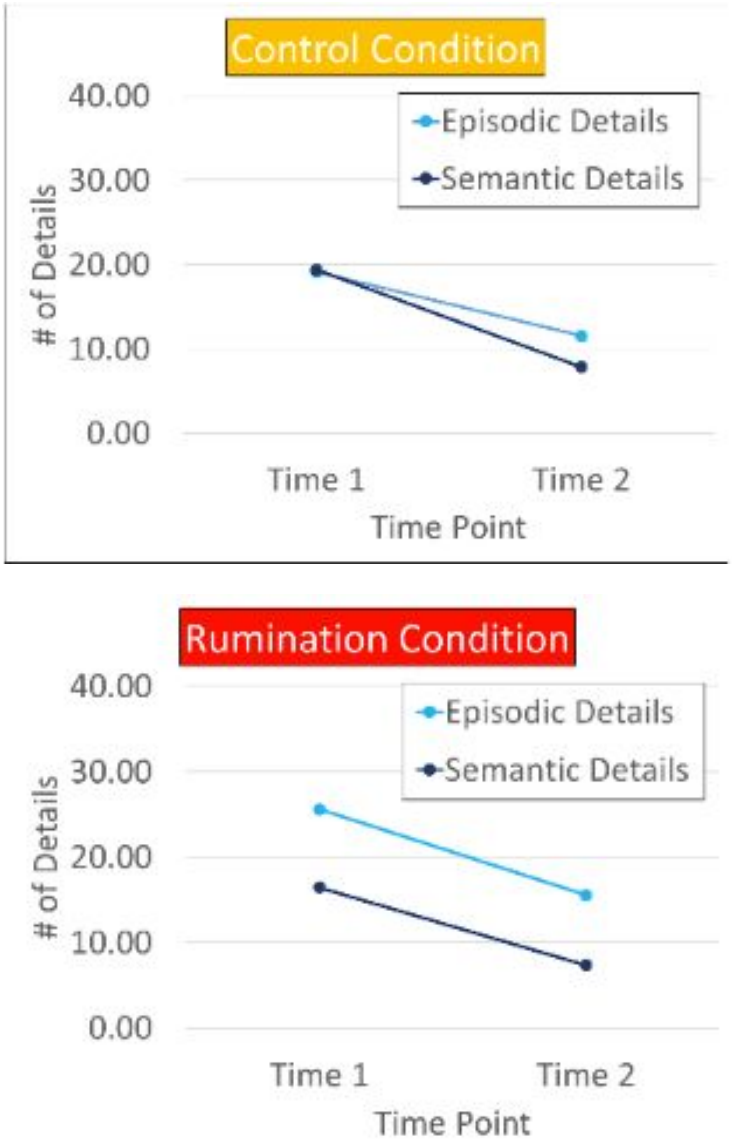
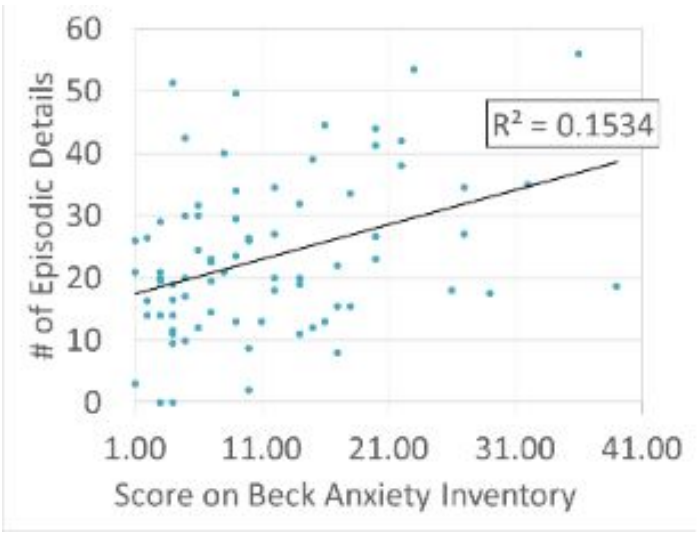


Figure 3: Scatterplot for showing the difference in episodic and semantic details produced at each timepoint in the control and rumination conditions.



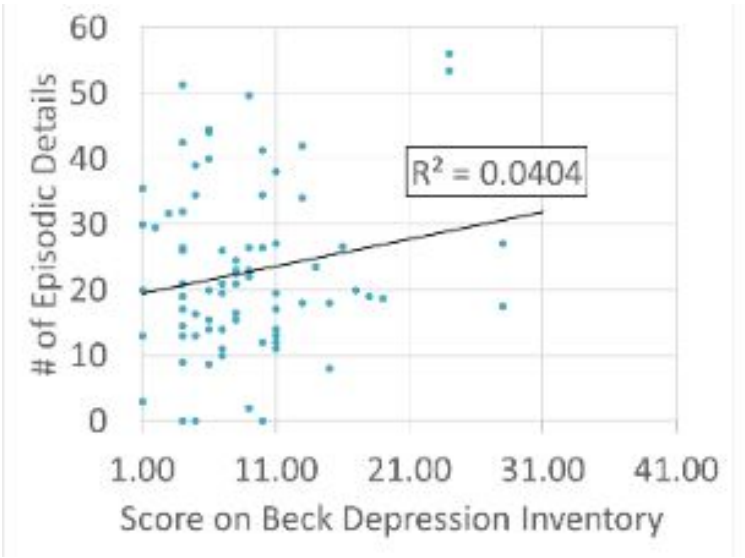


Figure 4: Scatterplots for the relationship between anxiety, depression ,and number of episodic details.

Appendix: IRB Approval and Consent Form

To: Kathryn Hardin Psychology CAMPUS EMAIL
From: Lisa Curtin, PhD, IRB Chairperson
Date: 10/27/2016
RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Agrants #: **Grant Title**:
STUDY #: 17-0009
STUDY TITLE: Memory Recollection and Cognition
Submission Type: Initial
Expedited Category: (6) Collection of Data from Recordings made for Research Purposes,(7) Research on Group Characteristics or Behavior, or Surveys, Interviews, etc.
Approval Date: 10/27/2016
Expiration Date of Approval: 10/26/2017

The Institutional Review Board (IRB) approved this study for the period indicated above. The IRB found that the research procedures meet the expedited category cited above. IRB approval is limited to the activities described in the IRB approved materials, and extends to the performance of the described activities in the sites identified in the IRB application. In accordance with this approval, IRB findings and approval conditions for the conduct of this research are listed below.

All approved documents for this study, including consent forms, can be accessed by logging into IRBIS. Use the following directions to access approved study documents.

1. Log into IRBIS
2. Click "Home" on the top toolbar
3. Click "My Studies" under the heading "All My Studies"
4. Click on the IRB number for the study you wish to access
5. Click on the reference ID for your submission
6. Click "Attachments" on the left-hand side toolbar
7. Click on the appropriate documents you wish to download

Approval Conditions:

Appalachian State University Policies: All individuals engaged in research with human participants are responsible for compliance with the University policies and procedures, and IRB determinations.

Principal Investigator Responsibilities: The PI should review the IRB's list of PI responsibilities. The Principal Investigator (PI), or Faculty Advisor if the PI is a student, is ultimately responsible for ensuring the protection of research participants; conducting sound ethical research that complies with federal regulations, University policy and procedures; and maintaining study records.

Modifications and Addendums: IRB approval must be sought and obtained for any proposed modification or addendum (e.g., a change in procedure, personnel, study location, study instruments) to the IRB approved protocol, and informed consent form before changes may be implemented, unless changes are necessary to eliminate apparent immediate hazards to participants. Changes to eliminate apparent immediate hazards must be reported promptly to the IRB.

Approval Expiration and Continuing Review: The PI is responsible for requesting continuing review in a timely manner and receiving continuing approval for the duration of the research with human participants. Lapses in approval should be avoided to protect the welfare of enrolled participants. If approval expires, all research activities with human participants must cease.

Prompt Reporting of Events: Unanticipated Problems involving risks to participants or others; serious or continuing noncompliance with IRB requirements and determinations; and suspension or termination of IRB approval by an external entity, must be promptly reported to the IRB.

Closing a study: When research procedures with human subjects are completed, please log into our system at https://appstate.myresearchonline.org/irb/index_auth.cfm and complete the Request for Closure of IRB review form.

Websites:

1. PI responsibilities: http://researchprotections.appstate.edu/sites/researchprotections.appstate.edu/files/PI%20Responsibilities.pdf

2. IRB forms: http://researchprotections.appstate.edu/human-subjects/irb-forms

CC:
Lisa Emery, Psychology

Consent to Participate in Research

Information to Consider About this Research

Memory Recognition and Cognition

Principal Investigator: Kathryn Hardin
Department: Psychology
Contact Information:

Kathryn Hardin – PI
hardinkl@appstate.edu
(940) 393 – 5137

Dr. Emery – Faculty Advisor
emerylj@appstate.edu
828-262-2272, ext. 416

You are being invited to take part in a research study about memory recollection and cognition. If you take part in this study, you will be one of about 75 people to do so. By doing this study we hope to learn about cognitive performance and memory.

The research procedures will be conducted on the second floor of Smith-Wright on the campus of Appalachian State University.

You will be asked to describe in detail a recent memory, which will be audio recorded. Additionally, you complete a set of standardized cognitive tests with the experimenter and fill out a number of questionnaires on your own. You cannot volunteer for this study if you are under 18 years of age.

What are possible harms or discomforts that I might experience during the research?

To the best of our knowledge, the risk of harm for participating in this research study is no more than you would experience in everyday life.

What are the possible benefits of this research?

There may be no personal benefit from your participation but the information gained by doing this research may help others in the future by expanding the scientific community's understanding of the relationship between memory recollection and cognition.

Will I be paid for taking part in the research?

We will compensate you for the time you volunteer while being in this study. Participants participating for class credit will receive 3 ELC credits.

ELC Credit: You will not be paid for your participation in this study. However, you can earn 3 ELC credits for your participation. There are other research options and non-research options for obtaining extra credit or ELC's. One non-research option to receive 1 ELC is to read an article and write a 1-2 page paper summarizing the article and your reaction to the article. More information about this option can be found at: psych.appstate.edu/research. You may also wish to consult your professor to see if other non-research options are available.

Non ELC Credit: Participants who are not eligible for ELC credits will receive $20. Payment will be paid in full in the event that you chose to end the study early.

How will you keep my private information confidential?

We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information or what that information is. Your data will only be associated with a subject number, which will not be linked with your name. Data will be kept indefinitely but will be stripped of any personal identifiers.

Who can I contact if I have questions?

The people conducting this study will be available to answer any questions concerning this research, now or in the future. You may contact the Principal Investigator at hardinkl@appstate.edu. If you have questions about your rights as someone taking part in research, contact the Appalachian Institutional Review Board Administrator at 828-262-2692 (days), through email at irb@appstate.edu or at Appalachian State University, Office of Research and Sponsored Programs, IRB Administrator, Boone, NC 28608.

Do I have to participate? What else should I know?

Your participation in this research is completely voluntary. If you choose not to volunteer, there will be no penalty and you will not lose any benefits or rights you would normally have. If you decide to take part in the study you still have the right to decide at any time that you no longer want to continue. There will be no penalty and no loss of benefits or rights if you decide at any time to stop participating in the study. If you decide to participate in this study, let the research personnel know. A copy of this consent form is yours to keep.

This research project has been approved by the Institutional Review Board (IRB) at Appalachian State University.

This study was approved on: September 26, 2016
This approval will expire on September 25, 2017 unless the IRB renews the approval of this research.

_____

Participant's Name (PRINT) Signature Date